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10/635,821	08/05/2003	Masahiro Morishima	03460/LH	7702

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EXAMINER

JOHNS, ANDREW W

ART UNIT

PAPER NUMBER

2621

DATE MAILED: 05/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/635,821

Applicant(s)

MORISHIMA ET AL.

Examiner

Andrew W. Johns

Art Unit

2621

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) 24,36 and 37 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10,13-23 and 25-35 is/are rejected.
- 7) ☒ Claim(s) 11 and 12 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 8/5/03.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election without traverse of Group I (claims 1-23 and 25-35) in the reply filed on 18 November 2004 is acknowledged.

2. Claims 24 and 36-37 are withdrawn from further consideration pursuant to 37 C.F.R. § 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 18 November 2004.

### *Claim Rejections - 35 U.S.C. § 101*

3. 35 U.S.C. § 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. Claims 25-35 are rejected under 35 U.S.C. § 101 because the claimed invention is directed to non-statutory subject matter.

Claims 25-35 are variously directed towards a "computer program product configured to store instruction for execution on a computer system..." However, none of these claims clearly define the computer program as being tangibly embodied in a computer readable medium. A computer program product, in and of itself, is not a tangible product, but is instead considered to be functional descriptive material that imparts specific functionality on a computer when executed. Such functional descriptive material can only be considered statutory when it is clearly defined as being tangible embodied in a computer readable medium. See M.P.E.P. § 2106. Because the computer program product recited in claims 25-35 does not clearly require the program to be tangibly embodied in such a computer readable medium, these claims do not define statutory subject matter.

***Claim Rejections - 35 U.S.C. § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

5 (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the  
10 international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1-3, 5, 13, 16, 20, 25, 28 and 32 are rejected under 35 U.S.C. § 102(e) as being anticipated by Asar (US 6,434,264 B1).

15 Asar teaches an image comparison apparatus (40 in Figure 3, for example), comprising:  
observation image capturing means (60 in Figure 3; column 13, lines 66 through column 14, line  
20 20) for capturing at least one of a macroscopic observation image of a specimen or a microscopic observation image of the specimen (as described at column 14, lines 21-38, Asar captures a high resolution image of the entire circuit board, which constitutes a macroscopic image of the specimen, so that Asar captures *at least one* of these types of images as claimed); photographing  
25 means (172 in Figure 3) for photographing an observation image captured by the observation image capturing means (column 13, line 67 through column 14, line 1; the camera electronics photograph the image captured by the lens arrangement 170); recording means for recording a reference image in advance (column 20 lines 13-16; the reference image of the "Golden Board" is stored on the computer's disk drive); and display means (92 in Figure 1) for displaying the observation image photographed by the photographing means as a comparison image, and also displaying the reference image recorded on the recording means on the display means so as to allow comparison between the comparison image and the reference image (column 21, lines 21-

44; the image of the test board under inspection and the reference image of the “Golden Board” are both displayed in an alternating fashion to allow comparison), as stipulated by claim 1.

Further, Asar additionally teaches that the observation image capture means comprises at least one of illumination means for irradiating the specimen with light and making scattered light therefrom observable, illumination means for irradiating the specimen with light and making fluorescence therefrom observable, illumination means for irradiating the specimen with polarized light and making scattered light therefrom observable, and illumination means for transmitting light through the specimen and making transmitted light observable (column 14, line 62 through column 15, line 17; the illumination system irradiates the specimen with light and makes scattered (i.e. reflected) light observable, so that Asar provides *at least one* of the illumination means as claimed), as required by claim 2; that the display means displays the comparison image as a live image (column 21, lines 3-4; test board image is displayed after successful capture), as defined in claim 3; and wherein the display means alternately displays the comparison image and the reference image at predetermined intervals (column 21, lines 38-48), as set forth in claim 5.

With respect to claim 13, Asar teaches an image comparison method comprising: capturing at least one of a macroscopic observation image and a microscopic observation image of a specimen (as described at column 14, lines 21-38, Asar captures a high resolution image of the entire circuit board, which constitutes a macroscopic image of the specimen, so that Asar captures *at least one* of these types of images as claimed); photographing the captured observation image (column 13, line 67 through column 14, line 1; the camera electronics photograph the image captured by the lens arrangement 170); and displaying an entire or part of a comparison image obtained from the photographed observation image and an entire or part of a

reference image prepared in advance so as to allow comparison therebetween (column 21, lines 21-44; the image of the test board under inspection and the reference image of the “Golden Board” are both displayed in an alternating fashion to allow comparison; note that a corresponding single subportion of the images of the test board and golden board are displayed; column 21, lines 38-39). Asar also teaches that the displaying includes displaying at least one of the comparison and the reference image in the form of a live image (column 21, lines 3-4; test board image is displayed after successful capture), as further stipulated by claim 16.

With respect to claim 20, Asar also teaches an image comparison method comprising: capturing a macroscopic observation image or a microscopic observation image of a specimen (as described at column 14, lines 21-38, Asar captures a high resolution image of the entire circuit board, which constitutes a macroscopic image of the specimen, so that Asar captures *one* of these types of images as claimed); photographing the captured observation image (column 13, line 67 through column 14, line 1; the camera electronics photograph the image captured by the lens arrangement 170); and alternately displaying a comparison image obtained from the photographed observation image and a reference image prepared in advance at predetermined time intervals (column 21, lines 38-48).

Finally, claims 25, 28 and 32 each variously stipulates a computer program product configured to store a program that implements the methods variously stipulated in claims 13, 16 and 20, which are met by Asar as pointed out more fully above. Asar further teaches that the processing described therein is implemented using computer programs stored on computer readable media (column 16, lines 29-47), so that Asar also anticipates the computer program product defined in claims 25, 28 and 30.

***Claim Rejections - 35 U.S.C. § 103***

7. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

5 (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10 8. Claims 4, 8, 17, 23, 29 and 35 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Asar as applied to claims 1-3, 5, 13, 16, 20, 25, 28 and 32 above, and further in view of Inaoka et al. (US 6,351,550 B1).

15 While Asar meets a number of the limitations of the claimed invention, as pointed out more fully above, Asar fails to specifically teach displaying an addition image obtained by adding the comparison image and the reference image at an arbitrary ratio, as further stipulated in claims 4, 17 and 29; or performing a subtraction between the comparison image and the reference image and performing display on the basis of the subtraction results, as defined in claims 8, 23 and 35.

20 However, Inaoka et al. teaches an image comparison apparatus and method that alternately displays a reference image and a comparison image (column 15, lines 16-18), wherein the images are added at an arbitrary ratio prior to the blinking (i.e. the images are logically summed; column 15, lines 36-48; and the alternate display uses the comparison image and the summed image; column 17, lines 1-10). Alternatively, Inaoka et al. determines the difference (i.e., subtraction) between the images (column 16, lines 23-34) and performs the display based on the difference results (column 18, lines 3-14). Because the combination of reference and  
25 comparison images prior to the blinking or alternating display of the images suggested by Inaoka

et al. improves the visual perception of the differences between the two images, it would have been obvious to one of ordinary skill in the art at the time of the invention to include such enhancements in the display of Asar to similarly enhance the visibility of the defects therein. Therefore, the claimed invention would have been obvious to one of ordinary skill in the art at the time of the invention by applicant.

9. Claims 6, 14, 21, 26 and 33 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Asar as applied to claims 1-3, 5, 13, 16, 20, 25, 28 and 32 above, and further in view of Lloyd et al. (US 3,916,439 A).

While Asar meets a number of the limitations of the claimed invention, as pointed out more fully above, Asar fails to specifically teach displaying at least one of the comparison image and the reference image after adjusting brightness by integration processing, as further stipulated in claims 6, 14, 21, 26 and 33.

Lloyd et al. teaches an image comparison apparatus and method that displays a comparison image and a reference image to allow comparison between the two (column 2, lines 32-44), and further teaches adjusting the brightness of the images for display (36 in Figure 4) so as to emphasize the differences between the two images, resulting in easier identification of flaws (column 4, lines 26-30). Because this brightness adjustment improves the visibility of the differences between the images and thus improves the inspection, it would have been obvious to one of ordinary skill in the art to use such an enhancement in the Asar et al. system.

10. Claims 18 and 30 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Asar and Inaoka et al. as applied to claims 4, 8, 17, 23, 29 and 35 above, and further in view of Lloyd et al.



While Asar and Inaoka et al. variously meet a number of the limitations of the claimed invention, as pointed out more fully above, Asar and Inaoka et al. each fails to specifically teach displaying at least one of the comparison image and the reference image after adjusting brightness by integration processing, as further stipulated in claims 18 and 30.

5           Lloyd et al. teaches an image comparison apparatus and method that displays a comparison image and a reference image to allow comparison between the two (column 2, lines 32-44), and further teaches adjusting the brightness of the images for display (36 in Figure 4) so as to emphasize the differences between the two images, resulting in easier identification of flaws (column 4, lines 26-30). Because this brightness adjustment improves the visibility of the differences between the images and thus improves the inspection, it would have been obvious to one of ordinary skill in the art to use such an enhancement in the Asar et al. system.

10           Claims 7, 15, 22, 27 and 34 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Asar as applied to claims 1-3, 5, 13, 16, 20, 25, 28 and 32 above, and further in view of Ott et al. (US 5,600,732 A).

15           While Asar meets a number of the limitations of the claimed invention, as pointed out more fully above, Asar fails to specifically teach displaying the comparison image and the reference image upon further superimposing a lattice with a predetermined spacing thereon, as further required by claims 7, 15, 22, 27 and 34.

20           However, Ott et al. teaches an image comparison system and method that superimposes a lattice with a predetermined spacing on image (i.e., grid of lines 28 and 30 shown in Figure 2, for example), which provides positional information that simplifies the comparison of the images. Because Asar requires the images to be registered for comparison, and because the use of such a

grid simplifies such a registration, it would have been obvious to one of ordinary skill in the art to use such a lattice or grid in the Asar comparison scheme.

12. Claims 19 and 31 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Asar and Inaoka et al. as applied to claims 4, 8, 17, 23, 29 and 35 above, and further in view of Ott et al.

While Asar and Inaoka et al. variously meet a number of the limitations of the claimed invention, as pointed out more fully above, Asar and Inaoka et al. each fails to specifically teach displaying the comparison image and the reference image upon further superimposing a lattice with a predetermined spacing thereon, as further required by claims 19 and 31.

However, Ott et al. teaches an image comparison system and method that superimposes a lattice with a predetermined spacing on image (i.e., grid of lines 28 and 30 shown in Figure 2, for example), which provides positional information that simplifies the comparison of the images. Because Asar requires the images to be registered for comparison, and because the use of such a grid simplifies such a registration, it would have been obvious to one of ordinary skill in the art to use such a lattice or grid in the Asar comparison scheme.

13. Claims 9-10 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Asar as applied to claims 1-3, 5, 13, 16, 20, 25, 28 and 32 above, and further in view of Bishop et al. (US 4,589,140 A).

While Asar meets a number of the limitations of the claimed invention, as pointed out more fully above, Asar fails to specifically teach capturing *both* a macroscopic image and a microscopic image, with an optical path switching means for switching the optical path between the two, as further required by claim 9.

Bishop et al. teaches comparing a reference image and a test image to detect defects, and further teaches that the imaging system has units for capturing macroscopic and microscopic images and means for switching between the two (column 8, lines 55-60; the camera images the specimen through the microscope at a plurality of magnification settings, thus providing both macroscopic and microscopic images). Because Asar teaches the desirability of zooming the images being compared (column 23, lines 5-26), and because the switchable image capture system suggested by Bishop et al. provides a convenient source of images at different magnifications, it would have been obvious to one of ordinary skill in the art to use such an image capture arrangement in the Asar system.

#### *Allowable Subject Matter*

14. Claims 11-12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### *Conclusion*

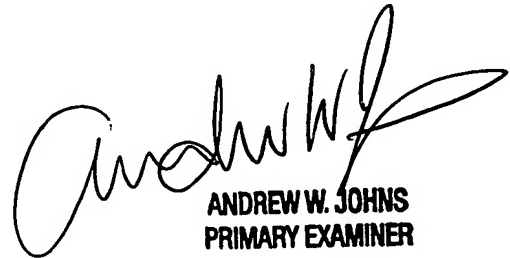
15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Barker et al. determines the differences between a test image and a reference image. Eskridge et al., Goonetilleke, Lafreniere, and McCormack each teaches displaying a reference and a comparison image together to allow visual comparison.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Johns whose telephone number is (571) 272-7391. The examiner is normally available Monday through Friday, at least during the hours of 9:00 am to 3:00 pm Eastern Time. The examiner may also be contacted by e-mail using the address: andrew.johns@uspto.gov. (Applicant is reminded of the Office policy regarding e-mail communications. See M.P.E.P. § 502.03)

If attempts to reach the examiner are unsuccessful, the examiner's supervisor, Bhavesh Mehta, can be reached at (571) 272-7453. The fax phone number for this art unit is (703) 872-9306. In order to ensure prompt delivery to the examiner, all unofficial communications should be clearly labeled as "Draft" or "Unofficial."

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center Receptionist whose telephone number is (571) 272-2600.

A. Johns  
6 May 2005



ANDREW W. JOHNS  
PRIMARY EXAMINER